

THIS LECTURE

ON THE

ANATOMY, PHYSIOLOGY, AND PATHOLOGY
OF THE EYE,

WAS DELIVERED ON WEDNESDAY, THE 26TH OF JANUARY, 1831,

BY THOMAS FIRTH;

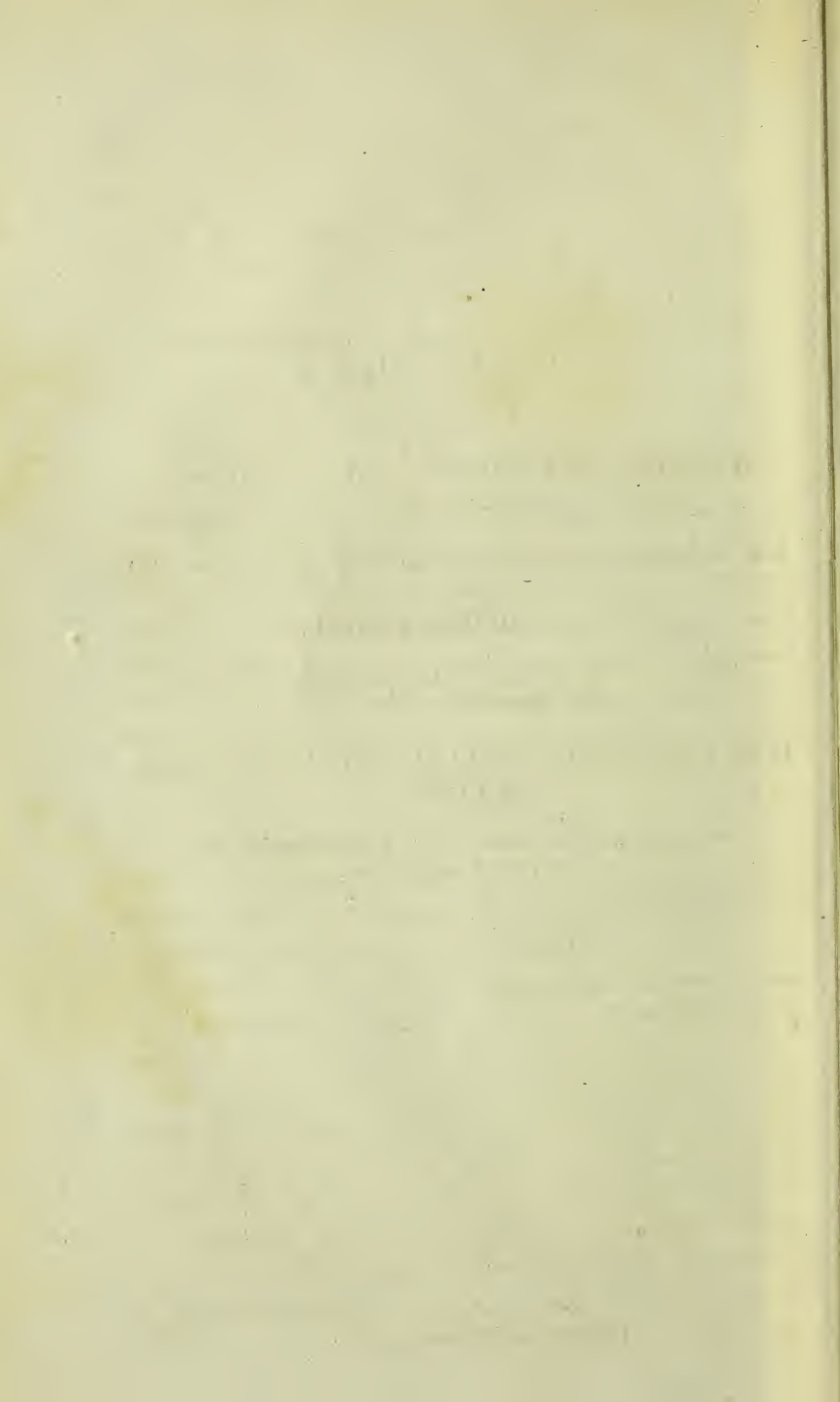
AND IS MOST RESPECTFULLY DEDICATED TO THE
MEMBERS OF THE

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MR. PRESIDENT,

To be surrounded by Gentlemen like those whom I am about to address, inspires me with confidence, that the City of London Medical and Chirurgical Society will very soon enrol amongst its members some of the first medical men that this or any country ever produced, and be, I trust, a lasting benefit to the public generally. As there are some here this evening who have not been present at my former Lectures, I beg to state for their information the object of this Society.

You are aware, Sir, that to begin to practise Medicine and Surgery is one thing, and that a comprehensive knowledge of them is another: all persons have not the same opportunity of becoming acquainted with their profession, neither have they the same fertile genius to discover, or suggest means, best calculated to prolong the life of man.

Gentlemen, the object of this society is to increase those opportunities, and thereby raise a field of reflective objects, by which the human suffering may be mitigated. Every well-educated medical practitioner is aware that anatomy, human and comparative, is the basis of a sound medical education, I therefore take this opportunity to recommend the present and rising professional public, to let no opportunity pass, by which a correct knowledge of this branch of science may be obtained.


It is difficult, tedious, and exceedingly repugnant to the feelings of many, to pore over the lifeless body for days, weeks, and many years, in order to obtain this knowledge ; but I may venture to say, that there are few in our profession who do not experimentally feel the importance of the following quotation, viz. "The proper study of mankind is man."

It is my intention this evening to present to your notice one of the most important organs belonging to man, *i. e.* the eye ; and I shall likewise mention some of the diseases to which it is liable. The eye is surrounded by seven pieces of osseous substance, forming, when united, the orbit or socket which serves as its defence, and also for the attachment of various muscles that are connected with the eye.

That the non-professional part of this assembly may understand what I mean by muscle, I beg to refer them to my Introductory Lecture, and at the twenty-fourth page, it is stated that "Muscle is a compound of small fibres connected together by cellular substance, and interspersed with blood vessels, absorbents, and nerves." I also beg leave to observe that muscles are of various sizes, some being of considerable magnitude, and others very small ; those muscles which are appendages to the eye are of the latter description, as will be seen when I show them.

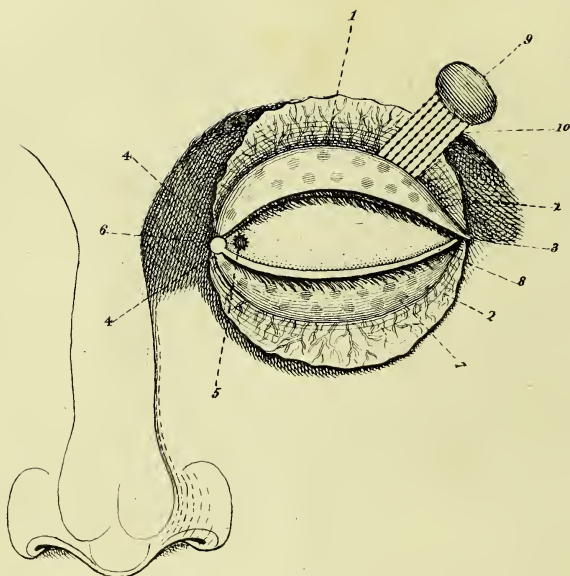
In describing the eye, anatomists usually consider, first, its appendages, called external parts ; and afterwards those forming the globe, called internal parts. Of the external parts, I must first notice the *supercilia* or eyebrow, which is the line of hair forming an arch over the eye.

I have no doubt that some of the non-professional part of this assembly will, while I am now describing this part, ask themselves its various uses ; some may suppose it a mark of beauty only, others may think to the contrary ; but



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anatomists say its use is to assist in shading the eye from too strong a light, and also to defend it from the sensible transpiration or sweat which flows down from the forehead.

The eyelids are formed externally of common integuments, under which are situated two muscles, the one called *orbicularis palpebrarum*; and the other *levator palpebræ*. The first of these muscles surround the eyelids, and when brought into action it closes the eyelids. The second of these muscles arise deep within the orbit, near the opening by which the optic nerve is transmitted to the eye, and on which I now rest the probe, by a small flat tendon, which afterwards becomes fleshy and terminates, first in the eyelid, by a considerable expansion of muscular fibre, and lastly by tendon. The use of this muscle is to raise the upper eyelid. The action of the eyelids is exceedingly quick, particularly the upper one, and on their exterior edge we observe a row of hair called *celia*, or eyelashes. In the diagram, plate I., fig. 1, and 2, I have endeavoured to represent the eyelids which are divided into first, superior, and secondly, inferior; also into outer canthus, plate I., fig. 3, and inner canthus, fig. 4. On the inner canthus, fig. 5, there is a discernible small red tubercle, which all of you may perceive in your own or in another person's eye, if you examine it: this small red tubercle is called *caruncula-lachrymalis*, and from it we may observe a number of small hairs arise. This small glandular body secretes a peculiar substance called smegma, which is said to be exceedingly offensive to insects. On the very extremity of the internal canthus interiorly, diagram plate I., fig. 6, there is a small opening called *punctum lachrymalis*, from this opening interiorly a small canal is formed, which meeting with the one from the other eye, forms the *lachrymal sac*, a continuation of which is

called the *ductus ad nasum*, which duct conveys the secretions of the eye into the nose. In the diagram, plate I., fig. 7, you may perceive a number of small dots, situated on the immediate edge of the eyelids; these dots are to represent the meibomian glands, which, in the living subject, are situated immediately under the skin, and they secrete a sebacious matter that softens the extreme edges of the eyelids, and prevents them from adhering together during sleep. The meibomian glands are liable to become affected in common inflammation of the eye, also in scrofulose inflammation, and in *psorophthalmia*, and also in the disease called *ectropium*, or turning out of the eyelids with redness. Ectropium being a disease not only unsightly in its appearance, but also a very obstinate affection, requires our most serious consideration, as when it arises from scrofula, or hereditary pre-disposition, it not unfrequently baffles very excellent surgeons. Out of a many cases of this kind, at present under my care, I will relate one of seven years standing, which has begun to yield under mild alterative treatment. This case made its appearance when the patient was commencing the third year of her age, immediately after having had the measles. The eyelids were so much turned out, that the patient became frightful to look at: the *puncta lachrymalia* were obstructed or turned from their proper direction, so that the increased vitiated secretions of the eye were forced over the cheeks, and by it the skin upon the cheeks was in one continued state of excoriation. In conclusion, I beg to inform you that this case is very nearly well, the skin being entirely healed, the secretions of the eye much diminished, the eyelids appearing natural, with the exception of a slight redness upon their upper surface.

In returning to the descriptive part of my lecture, I beg leave to request your attention to the diagram, plate I.,

fig. 8, and upon the immediate edge of the eyelid you will observe a line extending from the outer to the inner canthus of the eye : this part is of a cartilaginous structure, and on the whole of its exterior surface there is a groove which serves to convey the tears into the *punctum lachrymalis*.

The eyelids serve to cover the eye during sleep, as you are all aware of, as well as to defend it from various substances accidentally, or otherwise directed upon it ; also to lubricate the outer *tunic* by moving the lachrymal secretions over its surface.

While stating that the eyelids serve to defend the eye from various substances accidentally or otherwise directed upon it, I am reminded of a circumstance which occurred on the 5th day of December, 1830, to a gentleman who I was called to attend, and which circumstance would have destroyed the eyes had not they been protected by those appendages. As I proceed with the circumstance it will become, I have no doubt, familiar to you, in consequence of its being attended with a premeditated ferocity; hardly equalled in the annals of history, and from its having been reported in all the daily and weekly newspapers of the day. This case is that of Mr. and Mrs. W., who had nitric acid thrown in their face as they were proceeding to, or returning from Mr. Powell's chapel at Peckham, by a person professing to be a deist. I have been creditably informed that this person followed those worthy people nearly every Sunday for three months with a loaded pistol, and would have shot them had he not considered that death by a pistol-ball was too easy a death for them to die : the other expedient was therefore resorted to, he having considered that to deprive them of their eye-sight was a far greater punishment. This accident occurred on the Sunday, about one o'clock, and on the following morning I was sent for to

attend Mr. W., Mrs. W. having escaped uninjured, except her clothes, which were entirely destroyed. When I arrived, I found Mr. W's face in one continued state of inflammation, the *tunica conjunctiva*, or in other language the white of the eye, resembling a mass of coagulated blood. The eyelids were much injured, and also the whole face, and on the internal canthus of the left eye about half an inch in circumference the integuments and muscular portions were wholly destroyed, leaving when they were sloughed off, the superior nasal process of the superior maxillary bone, and the nasal process of the frontal bone quite exposed. The design of this infatuated man was entirely frustrated in the complete recovery of my patient; and to add to the patient's satisfaction, there remains no defect in his sight, or any marks on the skin, except a slight contraction of the integuments of the internal canthus of the left eye.

Various are the diseases to which the eyelids are liable, thirteen of which I beg leave in this place to enumerate. The first of these affections, and the most simple of the whole, is *Blepharophthalmitis*, or common inflammation.

The 2d is *Anchylops Erysipelatosa*, or erysipelalous inflammation of the internal canthus.

The 3rd is *Psorophthalmia*, or a disease propagated by the itch.

The 4th is *Hordeolum*, or sty.

The 5th is *Sarcoma Palpebrarum*, or a granular affection of the tunica conjunctiva, or white covering of the eye.

The 6th, *Distichiasis*, or double row of eyelashes.

The 7th, *Trichiasis*, or inversion of the eyelids.

The 8th, *Ectropium*, or eversion of the eyelids.

The 9th, *Blepharoptosis*, a morbid elongation of the eyelids.

10th, *Blepharoplegia*, or palsy of the eyelids.

This affection arises either from injury done to the parts

by blows, or it may arise from various emollient applications having been applied to the part; it is sometimes a consequence of water in the brain: worms in the stomach, or in the alimentary canal, may sometimes be the cause of this disease. The reason that I have particularly noticed this disease, is because I have two cases of this kind at present under my care, the one a person of twenty-five years of age, and the other an infant about twelve months old. The latter of these cases was overlooked by the parents for some time, nor were they impressed with its being a disease until after their friends had made continued and frequent observations respecting it. On my first visiting this patient, the left eyelid appeared nearly closed and immoveable by its own powers, and the pupil of the eye was turned towards the external canthus: the child appeared dull and heavy, resting its head upon the nurse's shoulder, or upon any thing that was near it. From the improvement already made in this case, I trust I shall be enabled in a future lecture to present the little patient to you perfectly cured, and at the same time acquaint you with the plan of treatment. Having commented thus far upon the tenth disease, which affects the eyelids, I must proceed to enumerate the remaining three that I have previously promised, the first of which being in order the

11th, is called *Blepharospasmus*, or cramp of the eyelids.

12th, *Anchyloblepharon symblepharon*, or concretions of the eyelids.

13th, *Tumores Cystici*, or encysted tumours of the eyelids.

In presenting this skull to your notice, I have to observe a small depression, and in which I will place the point of my probe. This serves for the situation of the *lachrymal gland*, (see diagram, plate I., fig. 9.) to which I beg leave to draw your immediate attention. Before I enter upon

the description of this gland, I beg to remind you, that glands are divided into three varieties, a particular description of which may be seen in the twenty-ninth page of my introductory lecture. The lachrymal gland is of the glomerate kind, and from it proceeds six or eight small passages called excretory ducts, (see diagram, plate I., fig. 10.) and through them its peculiar secretion is conveyed to the eye. The secretion of the *lachrymal gland* is sensibly increased in the act of crying, and gives out those large drops of water which you observe trickle down the face.

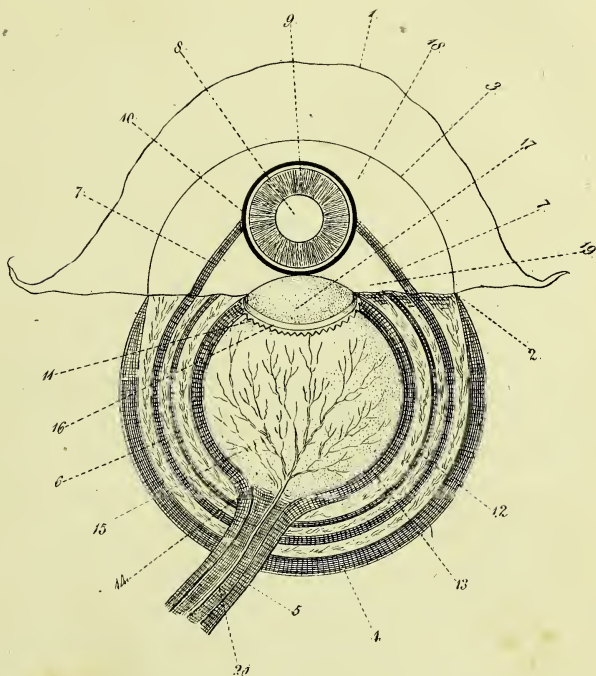
In the diagram, plate II., fig. 1, I have endeavoured to represent the white covering of the eye called *tunica conjunctiva*; it is very transparent, as can be seen by the dissection before you; it is also very highly vascular, and, from dissection, appears to be an expansion of the tendinous portion of the recti muscles. This membrane not only covers the eye, but is reflected over the internal surface of the eyelids, to which it is more loosely connected than to the eyeball. In separating this covering from the others of the eyeball we find it very easy to accomplish, except from the transparent cornea of the sclerotic coat, from which it cannot be separated. Vide diagram, plate II., fig. 2. This covering of the eye is liable to four varieties of inflammation, the first of which, and the most simple, arises from common cold, and is called *Ophthalmia Catarrhalis*.

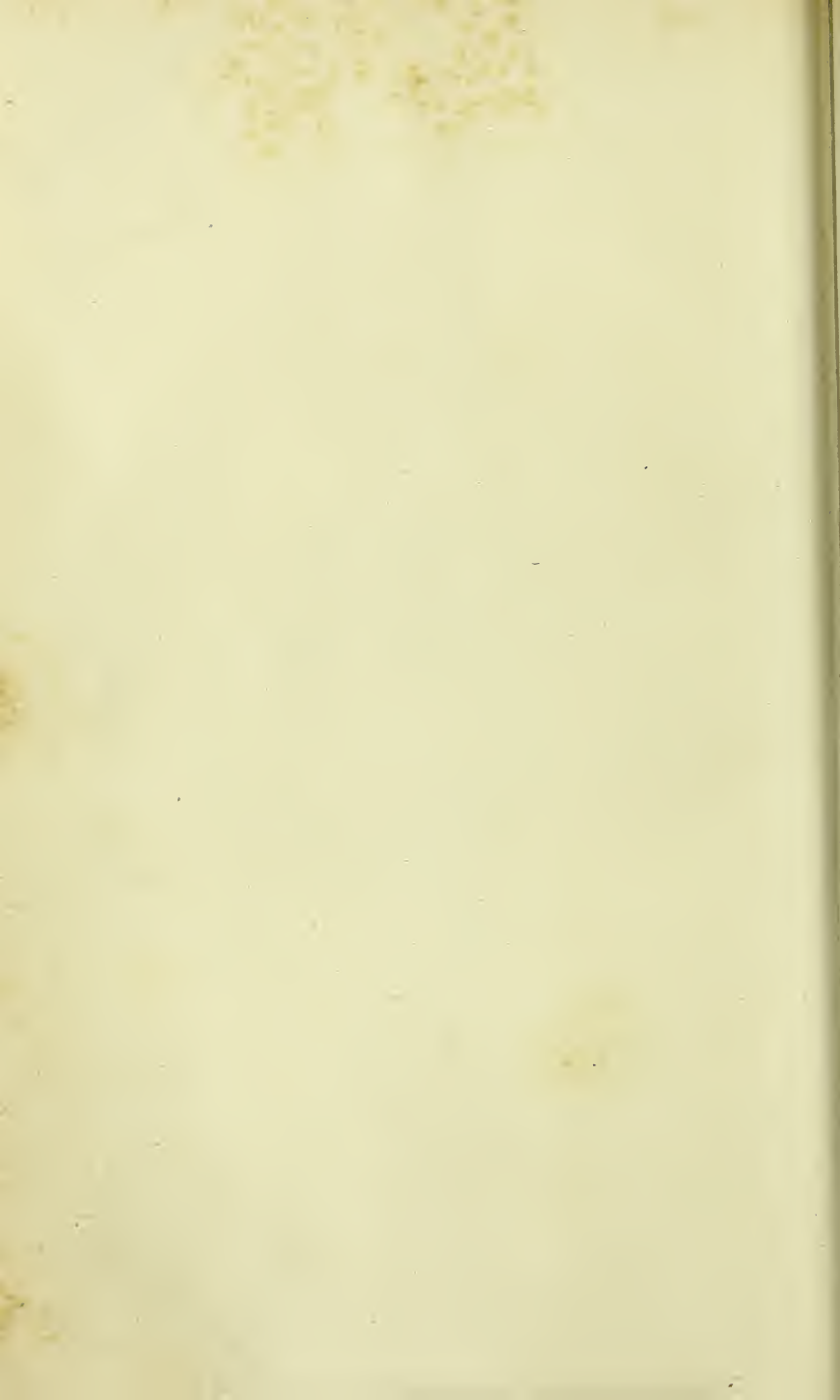
The second arises from scrofula, and is called *Ophthalmia scrofulosa*.

The third kind of inflammation is called *Blepharophthalmo-blennorrhœa*, or purulent inflammation.

The fourth and last is *Ophthalmia Gonorrhœica*, or inflammation arising from gonorrhea.

Scrofulose inflammation of the eye, and all diseases arising from scrofula, have for many years attracted my particular attention, and I feel pleasure in stating, from ex-





perience, that few cases that I have hitherto met with, have resisted the remedies which I have employed. By way of illustration, I will relate several cases of *strumous ophthalmia* that have come under my care; and being of unusual severity, they may perhaps be interesting.

The first is the case of a young lady, now about seventeen years of age, who, while at boarding-school, became the victim of this disease. On its commencement, the eyelids were much swollen, and the *tunica conjunctiva*, or in other words the white of the eye, was exceedingly red, or what is commonly called blood-shot. There was an incapacity to open the eyelids; light or heat would bring on considerable uneasiness, and sometimes pain in the eye; and there was an ichorous discharge constantly flowing from the eyes. When the mother of this young lady first consulted me, she stated that her daughter had been in the above state for three-years-and-a-half, always requiring the care of a person to attend her; she likewise stated, that her daughter had been thoroughly salivated six times, and had constantly taken medicines for the whole of that period, still the disease was not the least controlled by these measures, and her mental faculties had so far digressed, that she appeared idiotic. In looking over my case book, I find this patient was perfectly cured in six months after she was placed under my care; and at present she is a very fine young lady, her vision, mental faculties, and health being perfectly restored.

The next is the case of a young lady, now in her fourteenth year, who became the subject of *strumous ophthalmia* after having been vaccinated. Her parents had consulted various eminent surgeons during the whole period of seven years, and had visited many bathing places at their request; still the disease was not lessened in its severity, but as time advanced it became more aggravated. A friend of

mine, whose niece I was then attending in a similar case, recommended me to the parents, and, in consequence, I was sent for. When I arrived, I found this young lady seated in a dark room, and two or three handkerchiefs over her eyes, in order to obstruct the light and heat from the fire, which usually gave her pain. She was pale, emaciated, had scarcely any appetite, and that which she did eat was administered by an attendant. The bowels were constipated, the eyelids much swollen, the transparent cornea studded with small vesicles, and the aqueous humour turbid. This was one of the most difficult cases I have ever met with, resisting in a great measure all the remedies that were resorted to for five months, at which period the disorder yielded to the plan of treatment that I had previously suggested; and at the present period my patient is perfectly restored.

The third case which I shall notice, is a boy, about seven years of age, whose mother had hereditary scrofula, or in other words, king's evil. This little fellow had had strumous ophthalmia from his birth, and the *cornea transparens* of the right eye had become opaque from continued inflammation. As a symptom characteristic of this disease, the eyelids were much swollen, and the meibomian glands much affected, inasmuch that the eyelids were, if left without applications, constantly agglutinated: the right eyeball was much larger than the left, and the eyelids had become elongated. His appetite had suffered considerably, his general health was very bad, nor could they allow him to be the least exposed to the air without his having an increased accession of the inflammation. When he was placed under my care, his father informed me that he had spared no expense or trouble in endeavouring to get his son cured, and all plans hitherto had failed, and he was in consequence fearful that his son would always be the same;

however, he was placed under my care, and in about nine months afterwards I pronounced him cured, and up to this time he has had no relapse.

The fourth case, is a gentleman, aged forty-five, who stated that he had been much troubled with swellings in the neck during his youth, but after having made several sea voyages, they disappeared. When he applied to me the tunica conjunctiva was in one continued state of inflammation: he had great pain in his head, and his vision was so much impaired that he could not distinguish one thing from another. Both eyes were considerably larger than they had been previous to this affection; and on close examination, the iris appeared surcharged with blood, and the transparent cornea of a dull jelly-like appearance. He stated that this affection had been coming on for more than two years, and he had become fearful that his sight would leave him altogether. He had constant nausea of the stomach, appetite very bad, and bowels constipated. In about seven months this patient was perfectly cured.

Case 5. Mr. —, aged sixty, stated that he had been affected with a disease in the right eye for more than twelve years, and that about twelve months before he consulted me, the other eye had also become affected. He had been constantly taking medicine, and making use of various applications, some of which relieved him, while he persevered in their use, and others not at all: he could sometimes distinguish colours, but not distinctly. His appetite was exceedingly good, and his bowels regular: his nights were passed in sound sleep, excepting when he had taken a little cold, at which time the inflammation was much increased, attended with considerable dull heavy pain in the ball of the eye. The pupils of the eye were constantly much contracted, and the iris presented a

dark brown appearance. In three months this patient was perfectly cured.

Case 6. Miss —, aged eighteen years, of spare habit, and florid countenance, thick lips, broad and extended nostrils. She stated that her eyes had been inflamed, and painful at various periods for more than four years. Every morning when she awoke the eyelids were so firmly agglutinated that they required the use of warm water for some length of time before they could be separated: her appetite had been always very good, and her bowels regular. The disease made its appearance while she was at boarding school, had been constantly attended ever since by very highly respectable surgeons, and for the last six months had been under the care of the surgeons of an infirmary for diseases of the eye. Her right eye was much worse than the left, with which she could scarcely distinguish anything. On examining the eyes they appeared slimy, and from them there was a constant discharge of water, that gave her as much pain as if boiling water had been poured upon them: the transparent cornea was studded with blisters or small vesicles, the pupil was very small and contracted, and the eye was considerably affected by either light or heat; also the skin of the upper and lower lips was rough and cracked, forming a number of lines which appeared to emanate from the cuticle covering the interior of the lips. This patient is so far convalescent, that I may venture to calculate upon a perfect cure.

Case 7. Mr. —, aged twenty-nine years, in 1814 had leprosy, which continued visibly to affect him for more than ten years. During the whole of this period, his eyes were unaffected with any disease; but soon afterwards, while on the sea coast, a slight inflammation made its appearance. In about four months from the commence-

ment of this inflammation (apparently convalescent), he had the misfortune to be wet through in a thunder-storm, and, in consequence, the inflammation returned with redoubled violence; and his upper and lower extremities became so much contracted, with general weakness of the whole system, that he was unable either to walk or stand. There was a continued fever attendant on this affection, and the right eye appeared one continued mass of blood, with entire loss of vision. The appetite was feeble, being unable to digest any kind of animal food; the bowels were constipated; and the skin constantly hot and dry. When I first saw this patient, I had little hope of success; and, in consequence, I informed his friends that if they thought proper they might make a trial for three months, and at which time, if there was no amendment, they could discontinue; but if any amendment, however slight, was experienced, it would be quite sufficient to excite confidence in a further trial. This patient was perfectly cured in thirteen months. Perhaps I have been a little verbose in the recital of so many cases of one kind, but if that has been the case, I trust I shall be excused, having done so with a view to rouse your exertions in the cure of diseases, however slight your hope may be, and I would have you not slightly pass over cases because others have pronounced them incurable.

As well as the four kinds of inflammation above enumerated, the tunica conjunctiva is liable to a disease called *Pterejium* or winged film, and also *Lipoma* conjunctiva, meaning small tumours and excrescences. The posterior part of the eyeball is entirely surrounded by muscles, and by them this organ performs all the various motions to which it is liable.

The muscles of the eyeball are six in number, five of which arise from the edge of the optic foramen, situated at the posterior surface of the orbit, and on which I have now

placed the point of my probe : the other arises from the superior nasal process of the superior maxillary bone or upper jaw, and all of which are inserted into the sclerotic coat. The four muscles which I now present to your notice, are called recti muscles ; the first is denominated rectus superior, and raises the eye upwards : the second, and that which I have my finger upon, is called rectus inferior ; this muscle directs the eye downwards. The rectus externus directs the eye outwards, towards the temples ; and the rectus internus directs the eye inwards, towards the nose.

The two oblique muscles come next to be noticed, the superior of which arises from the edge of the optic foramen by a slender tendon, as you perceive by the dissection before you ;—a short distance from its origin, and at that part where it passes the eyeball, it becomes fleshy, and afterwards forms a smooth tendon, which passes through a cartilaginous pulley, situated in the upper and inner edge of the orbit : it is then directed downwards to be inserted into the eyeball.

The other of the oblique muscles is called obliquus inferior, and acts in direct opposition to the obliquus superior.—This muscle arises from the superior nasal process of the superior maxillary bone, passes indirectly backwards and outwards under the eye, and is inserted into the sclerotic coat opposite the former muscle.

Having described all those parts called external parts of the eye, I must now direct your attention to those parts denominated internal, and first the sclerotic coat.—This covering presents, on examination, a hard horny appearance, and is divided into two portions—the one called Cornea Opaque, represented by the diagram, plate II., fig. 4, and on which I will place the point of my probe, also by part of the actual covering, which I beg leave to send round for inspection ; the other portion of this covering, is called Cor-

nea Lucida, in consequence of its being transparent, and it also is represented in the diagram, plate II., fig. 3. The posterior surface of the cornea opake is perforated by the optic nerve, which you observe projecting from it, and is also represented in the diagram before you, plate II., fig. 5. The sclerotic coat is liable to suffer from rheumatic inflammation, and if it is not treated very actively, will terminate, in many constitutions, in entire loss of vision. About twelve months ago, I was requested to visit a lady one hundred and fifty miles from London, whose sight had been entirely destroyed by this kind of inflammation. She informed me that three years before the time of my seeing her, a slight inflammation in both eyes made its appearance, which afterwards became so severe, that it resisted all the remedies that were made use of, and that she had been two years in total darkness. On examining the eye, it was evident that no remedy, however judiciously administered, could be of any service, the whole structure of the eye being entirely disorganised.

Another protracted case of this kind has very recently come under my care; and if the representation of the gentleman be correct, his medical attendants had altogether mistook the nature of the case. I beg leave, however, to observe, that you must not always give ear to the railings which are directed against medical men; for such is the opinion of some, that no one can be skilful without he can cure incurable diseases. But to proceed in the description of this case, I beg leave to observe, that on examining the eye a green appearance presented itself in the centre of the pupil, with loss of action of the iris. The contractile power of the iris had been destroyed by the application of belladonna, as stated by the patient, and the vision was nearly extinct. There was *evident* deposition of lymph into the aqueous humour, notwithstanding from the benefit already

derived, I have every reason to hope, that by a perseverance in the plans suggested, for some time, a considerable improvement will be experienced. Under the sclerotic covering the choroid coat is situated, see diagram, plate II., fig. 6 ; it is exceedingly full of blood vessels, and by them it is connected to the above sclerotic covering. This coat or covering of the eye is not only vascular, but it is also a very soft and delicate membrane: it lies interiorly to the sclerotic coat, to which it adheres until it arrives at the transparent cornea, and there we find that it passes downwards and inwards to form the coloured part of the iris. Vide diagram, plate II., fig. 7. In the dissection before me, the iris presents itself, and in its centre there is an opening called the pupil, see diagram, plate II., fig. 8. It will be necessary here to observe, that the iris is divided into surfaces, the anterior, or that which is situated most outward is called iris, see diagram, plate II., fig. 9, and the posterior or inner surface, is called uvea. This portion of the eye, the iris, is possessed of peculiar contractile properties, rendering it very susceptible to the action of light. The iris is liable to inflammation called iritis, which nosologists have divided into three varieties, viz. *iritis idiopathica*, *iritis syphilitica*, and *iritis arthritica*. Until diseases of the eye had become more generally understood and more universally considered, these various affections received the general appellation of inflammation of the eye. The treatment of these various kinds of inflammation require considerable skill and firm decision, otherwise they are exceedingly liable to terminate in complete loss of vision ; nor is considerable skill and promptness required in the use of various remedies, but also a thorough knowledge of each variety; as each of which require a somewhat different plan of treatment. The iris is liable to be affected with the following diseases, viz. *mydriasis*, or a constant dilated state

of the pupil. *Myosis*, or nearly an obliteration of the pupil ; *synechia anterior and posterior*, or an adhesion of the anterior surface to the transparent cornea, or the posterior surface to the capsule of the crystalline lens : also *prolapsus iris*, a state of disease requiring an artificial pupil. If you closely examine the dissection that is passing round the room, and which is also represented in the diagram, plate II., fig. 10, you will observe a circle surrounding the exterior surface of the choroid membrane at the very edge, where it adheres to the ambit of the transparent cornea ; this white line is called the ciliary circle. If you more closely examine the dissection before you, you will find on the inner surface of the choroid membrane, corresponding in situation to the line on the exterior surface, a number of small grooves or striæ, plate II., fig. 11. They are called ciliary ligaments : these two parts of the eye are not unfrequently classed together under the name of *corpus ciliare*. The posterior surface of the choroid membrane is covered with a black substance called *pigmentum nigrum*, and this portion of the eye is most plainly observable in the dissection that is passing round the room, and it is also represented in the diagram, plate II., fig. 12.

For the sake of elucidation, I will digress a little from the immediate consideration of the internal parts of the eye, and briefly describe the origin of the optic nerve, the expansion of which is called the retina, see diagram, plate II., fig. 13, to which I wish to draw your most serious attention. All medical gentlemen present (and I am happy to see so many very highly respectable) are aware, that the brain is divided into *cerebrum* and *cerebellum*, also that the *cerebrum* is divided into two hemispheres or halves, each giving off the same number of nerves destined for the same purpose. The optic is one of those nerves, and emanates from the *thalami nervorum opticorum*. A little

before they pass out of the cranium into the orbit they unite, and again separate, one passing through the right optic foramen, to proceed to the right eye; and the other, through the left optic foramen, to the left eye. I have introduced a small piece of paper into each of these openings, and I will send the skull round for your inspection. The expansion of these nerves, as I have before stated, is called the retina, from *rete* a net, and is the immediate organ of vision; this is the substance, and it surrounds this transparent body called the vitrious humour, of which I shall afterwards speak. This rete is of a pulpy consistence, and, to me, its colour is something resembling a French grey, but most anatomists describe it as being of a whitish colour.

The dissection which I now request you to notice, clearly demonstrates the origin of the retina, commencing as you can observe from the optic nerve, immediately after it has penetrated the various coverings of the eye, see diagram, plate II., fig. 14. It is then expanded over the whole of the vitrious humour, vide diagram, plate II., fig. 15, and terminates in the ciliary processes, plate II., fig. 11, which have been previously described.

The retina is subject to a disease denominated by the Greeks *amauroris*, and by the Latins *gutta serena*, and it is one of the most lamentable affections that can afflict mankind. In some persons, this disease comes on very suddenly, and in other persons very gradually; but in whatever way it commences, it is one of the most difficult diseases that art or science have to contend with. That many cases of this kind are curable, if not too long neglected, under peculiar attention and management, I do not hesitate to affirm from experience, notwithstanding there are cases that will from the first baffle all our art; such, for instance, are those cases when the retina and pigmentum

nigram have been absorbed, or when particular tumours within the cranium, press upon the optic nerve. Amaurosis, from scrofula or worms in the intestinal canal, and from many other causes, will very often admit of cure under proper management and care. Two or three successful cases of amaurosis, I will relate; and first, that of a young lady, eighteen years of age, whose parents reside a considerable distance from London, but who have friends residing in the city of London. The letter which I received from the parents, relative to an opinion as to the probability of a cure, went on to say, that their daughter, five years before, had fallen down, dislocated her elbow, and bruised her head, but so very slight that they thought it of no consequence: some time after, they perceived that she could not see things so well as formerly, and in a few months she became quite blind.—At this period her appetite was voracious, and she had become exceedingly corpulent. She then lost the use of her lower extremities, and afterwards, her stomach became so weak that she could take no solid food. She was altogether confined to her bed, and bottles of boiling water kept constantly to her feet, and she was also covered by eleven blankets, still she continued to complain of cold. Beef tea became her almost only support, which was usually given to her boiling from the fire; notwithstanding, she would often say it was cold, and request them to boil it again. There was an unnatural curvature of the superior part of the spine, and she had constant head-ache. The bowels were constipated, nor were they ever evacuated, without her having taken aperient medicine, and she would frequently cry for hours together.

Three years before the time that I was consulted, she had been in London under the care of a gentleman generally considered the first surgeon in Europe, and such was his opinion after he had seen her daily for six weeks, that he

requested her mother to take her home, at the same time stating, that she would not live many weeks. To cut short this case, which must have become tedious by this time, I have only to say, that she was placed under my care, and in six months she could walk six or seven miles without resting, and at the expiration of eight, she could discover any object whatever. I do not mean to say that she could see as well as if she had not been previously affected, but sufficiently well to know persons, and what they were dressed in, and also the head from the point of a pin.

The next case that I have to notice, is one of a gentleman, 33 years of age, who is an architect. He stated that three years and a half ago, he found himself quite incapable of following his business from loss of vision. When he first perceived an alteration in his sight, it would frequently, when reading, appear as if a piece of fine net-work was before him; at other times, it would appear as if there was a blank space, and very frequently small sparks of fire would appear to dart through the eye. This patient was of a very delicate constitution, light complexion, and blue eyes, and his habits particularly regular. When he placed himself under my care, he said he had been six months under the care of a most respectable oculist in London, who had certainly done him a great deal of good, but could not get him beyond a certain ratio. This state appeared to him worse than actual blindness, as he was unable to distinguish any thing clearly, owing to a thick fog, which he said was always before him. In six weeks this gentleman, after he became my patient, could read any small print by taking great pains; and in four months he was entirely cured.

The next case, I am sorry to say, is one of those which, as I have said before, resists all remedial means, and as the patient is waiting below, I will introduce him to your notice. —He is 34 years of age, a joiner by trade, and has been

blind four years.—The cause of blindness is evidently within the cranium, and you observe that he is unable to stand steady, although he is endeavouring to support himself by his stick. The first knowledge he had of his sight being diminished, was one day when he was examining a piece of board with the eye he was unaccustomed so to do that he had been planeing ;*—he shortly after became occasionally giddy, and it became more severe after frequent large bleedings. He was taken into the London Hospital, was bled, salivated eight or nine times, and perpetual blisters were applied over his head. He was afterwards taken into the Borough Hospital, and was again salivated, blistered, and tarter emetic ointment rubbed all over the head. He removed himself from this hospital, and applied to the Moorfields' Eye Infirmary, when he was again salivated and cupped on the temples. I must here remark, that upon every application of the cupping glasses he found himself worse, and at last it brought on a hissing sensation in the ears, with considerable increase of the giddiness. In this state he applied to me, and in about six months after, he was enabled to distinguish the difference in a person's dress, at the distance of six yards. Unfortunately, however, for the poor man, these cheering hopes of cure did not last long, for on the severe frost of the winter in 1829 coming on, he took cold, which confined him to his bed for three weeks ; and afterwards, all remedies failed to improve him.

The next is the case of a young man, 29 years of age, of short, slender figure, light hair, and swarthy complexion. Six years before I saw him he had had a severe fit of rheumatic fever, which left him in a state of great weakness. He likewise stated, that he had had a blow on the head, and from it his head, on that part, was ever afterwards tender.

* It is usual for joiners to make use of one eye only, when they wish to know if their work be even.

He had pain in his right arm, which increased so much when in bed, that it prevented him sleeping, and had been in this state from the first of his illness. He had visited Bristol, Buxton, Harrowgate, and had made several sea voyages, from which he experienced no material relief. He also had had the opinion of several highly respectable physicians and surgeons in London, but from whom he experienced only temporary relief. His right eye was much larger than the left, and much more prominent, and vision almost extinct. The corner of the mouth of the same side was drawn towards the opposite one, and he had a difficulty in articulation. A little before he applied to me, he had been advised to be cupped, which brought on a sickness and giddiness that prevented him from either standing or sitting upright. This young man was cured in about fourteen months after he was placed under my care. The next portion of this beautiful piece of mechanism, that I have to notice is *the vitreous humour*; and it is this highly transparent substance that I hold in my hand, and which I have endeavoured to represent in the diagram, plate II., fig. 15: it is surrounded by the retina, and by a transparent membrane, called the hyaloid membrane. This membrane is formed into cells that contain a transparent fluid, as will be clearly demonstrated by my cutting it across with the scissors, or any sharp instrument. The external lamina of the hyaloid membrane, is attached to the internal surface of the retina forming a circle called *zonula ciliaris*. Between this ciliary zone and that portion of this membrane which covers the crystalline lens, a canal is formed, called the canal of petit; see diagram, plate II., fig. 16. I will show this canal by introducing a blow-pipe.

Situated upon the superior portion of the vitreous humour, and covered by a capsule, is this transparent body, called crystalline lens; vide diagram, plate II., fig. 17. It is a solid,

lentiform body, and bears some resemblance to ice. This substance, or the capsule that covers it, is liable to become opaque, constituting the disease called cataract. When the opacity is fully formed, surgeons generally remove the diseased part by an operation, three varieties of which are resorted to, according to the circumstances of the case: two of these varieties I will perform on the eyes now before us. The first operation, above alluded to, is named couching; meaning a depression of the lens into the vitreous humour, and the second extraction, or a removal of the lens through the transparent cornea.

The third manner of operating for cataract, is called keratonyxis, but formerly received in this country under the name of Saunders' operation. This mode of operating is much more simple than either couching or extraction; and, if it was suitable for all cases of cataract, the others would be entirely laid aside. Keratonyxis, is simply passing a needle through the transparent cornea, or through the cornea opaque, as in couching, and dividing the capsule of the crystalline lens, and afterwards the lens itself if it be thought necessary, which is to be brought into the anterior chamber for absorption. The absorption will be accomplished in eight or ten weeks, and in some persons much earlier.

Before you commence any of the above operations, it will be necessary that you should furnish yourselves with proper instruments; and as regards myself, I prefer the kind that I am about to use, and which are laid on the table before you. Not only should you provide yourselves with proper instruments, but you should also take care that the patient is in a proper state to undergo the operation, and that the case is one that will admit of benefit from it. Many writers on operative surgery recommend the patient to be placed in a chair without a back, and so low that the head

of the person about to undergo the operation, should be on a level with the breast of the operator.—Stools and various other apparatus have been contrived in order to place the patient in a good position, but, as far as regards myself, I prefer the recumbent position to every other.—The first operation of this kind that I ever witnessed, the recumbent position was selected, and being attended with such apparent ease to the patient, and convenience to the surgeon, I have always chosen it. Having satisfied yourselves of the necessity of the operation, and taken into consideration the requisites previously mentioned, you may perform the operation for extracting the lens in the following manner :—The eye having been fixed, you must introduce this knife, called the cornea knife, into the transparent cornea, about this distance, that is, one-twelfth of an inch, from the cornea opaque, and on a level with the centre of the pupil. The knife must then be carried forward to the opposite side of the cornea transparenens, which, when thoroughly cut through, the knife must be withdrawn, and this needle introduced, in order to make an opening in the capsule of the lens. When a sufficient opening has been made in the capsule, you must withdraw the needle, and shade the eye, in order to allow the pupil to dilate, after which, you must press the eyeball very gently either above or below, and the lens will pass out, as you now observe. The operation for depressing the lens is a much less difficult one than that of extraction, and must be performed in the following manner :—This needle, which I have now in my hand, called the couching needle, must be passed through the sclerotic coat about the sixteenth part of an inch from the cornea lucida, in an horizontal direction, taking care not to bring it in contact with the iris, or the ciliary nerves, or arteries ; when you can see the point of the needle in the centre of the eye, through the pupil, you must depress it so as to fix it in the lens, and by

raising the handle of the instrument you will press the lens to the bottom of the vitreous humour. When this part is accomplished, you may then withdraw the needle and close the eyelids, upon which you must apply a soft compress, and keep it constantly moistened with a refrigerant lotion. It will be right for me here to observe that sometimes the lens will regain its former position, but this will be occasioned either from the patient not observing the directions given, or from it not having been properly detached from its capsule: when this does happen, you must again resort to the operation, which may be repeated several times, if required, with perfect safety to the patient. The proximate cause of cataract remains in great obscurity; consequently, the general opinion of surgeons is, that a remedial plan of treatment is useless. As regards myself, I cannot subscribe to those opinions altogether, knowing, as I do from experience, that cataract may sometimes be prevented from progressing, and at other times entirely dispersed.

Let me not be understood, from the preceding remarks, to mean, that all kinds of cataract may be dispersed; on the contrary, I am most willing to allow, that the operation in some of those cases is our only hope. The first case of cataract that I may venture to say I dispersed, occurred to me about five years ago. The patient was a tall, thin man, black hair, and swarthy complexion. He stated that his sight had been decreasing three years, and that at the present time (that is when I first saw him), he could see nothing distinctly except out of the corner of his right eye. He had had the opinion of several surgeons in London, also in the country, and they informed him it was cataract.

On an examination, the aqueous humour appeared dull, having the appearance of muddy water, and in the centre of the pupil, posteriorly, there appeared a small round white

substance. I must admit, that when I took this gentleman under my care, I had little or no hope of success; but he having felt desirous of trying any measures in preference to an operation, I was induced to persevere in the plan of treatment that I had suggested. This patient could read large print in twelve months after I had began to attend him.

The next is the case of a young lady, eighteen years of age, black hair, pale complexion, and rather bulky in appearance. In the fourteenth year of her age her eyes became considerably inflamed, which continued more or less to affect her for eighteen months. Between the various intervals of inflammation she found great difficulty in making out objects, and in nine months from the commencement of the inflammation she became unable to distinguish any thing further than day from night. Although much inflammation had existed for the length of time above specified, yet none of the textures appeared to have undergone any important change except the lens or its capsule. On a slight examination of the eye nothing of importance could be discovered, and it presented more the appearance of amaurosis than cataract. When examined with a microscope, the opacity was discoverable, presenting an appearance in colour something like dark slate. The amendment in this case was very tedious, but progressive, and in eighteen months she was cured.

The next case that I have to notice is a person, thirty-four years of age, tall, spare habit of body, melancholy temperament, and his occupation sedentary. He stated that he had always a defect in his vision, requiring the book, or object that he was looking at, to be placed at a greater distance than persons do in general; this was the condition of his sight until he became twenty, years of age, and at this period objects became less plain, and they required to be placed at a much less distance than before.

He was advised to make use of spectacles, which were of great advantage for ten years, but afterwards they began to lose their good effects, and in three years he became blind. In 1827 he placed himself under my care; and, at the latter end of 1829, he could read large print without the assistance of spectacles.

The next, is the case of a child, two years and a half old, which caught cold in the second week from its birth, and from which circumstance both eyes became very much inflamed. The inflammation of the right eye yielded to the remedies prescribed by a very skilful surgeon who was then in attendance; but that in the left eye run on, undiminished in severity, for a very considerable length of time, and at last terminated in effusion of a milky substance* into the chambers of the eye, and which afterwards became turbid, so as to entirely destroy vision. When the child was of the age above mentioned, accidental circumstances brought me in connexion with the family, and the child was placed under my care, although I informed the parents that I was doubtful as to the result. This little patient was enabled in six months to see objects indistinctly, and in nine months from my first attendance this eye became perfectly clear.

The next and last case of this kind that I shall at present mention, is a lady, fourteen years of age, of sprightly, animated countenance, and very fair complexion. When in her ninth year she began to have repeated attacks of inflammation in the eye, accompanied with pain, and also great pain in the head. After having had various attacks of inflammation, and when apparently free from them, she would constantly see little black spots floating before her, and all objects on which she looked were very much obscured. On examining the eye, the iris appeared more forward than natural, and almost motionless; the aqueous

* This change is called by pathologists, hypogala.

humour turbid and of a milky appearance, and in the centre of the pupil, posteriorly, there was a projection about the size and colour of a small pearl. Under a modified plan of treatment from the former patient, this lady recovered her sight in the space of nineteen months.

The preceding cases are, in my opinion, sufficient to convince you that cataract is not a disease altogether irremediable; and I am strengthened in my conviction from constant experience, as well as in reflecting of the complete manner in which the lens is absorbed, after having been removed from its situation, or when its capsule has been lacerated.

The absorbent vessels of the eye appear to be exceedingly active in the removal of substances deposited in the chambers of the eye, or otherwise, provided those depositions are free from nutrient vessels, as is clearly demonstrated in the absorption of the lens after the operation of couching, or keratonyxis. From the preceding remarks it appears probable, that by restoring the healthy action of the secretory organs, and at the same time increasing the action of the absorbents, and particularly those of the eye, this disease may be prevented from progressing, and in some cases entirely removed. Experience of almost all individuals lead you to believe to the contrary of the above, but I beg leave to recommend you seriously to consider the cases above stated, and also to endeavour to combine remedies that will effectually answer the above intentions.

In a previous part of this lecture, I have stated that the proximate cause of cataract remains in great obscurity; notwithstanding, from the knowledge we possess of pathology in general, we may venture to attribute it sometimes to inflammation of the part; and, at other times to considerable inaction of the absorbents of the eye, thereby admitting depositions to take place, which these vessels are afterwards

unable to take up. Much more might be said on the theory of cataract, but as I should be compelled to intrude upon your time much longer than I feel it my duty so to do, I shall defer the subject to some future opportunity, and therefore proceed to consider the remaining parts of the eye, which have not as yet come under my notice.

The space between the transparent cornea and the crystalline lens is denominated the chambers of the eye, and is divided into anterior and posterior. That part which is situated between the transparent cornea and the iris, vide diagram, plate II., fig. 18, is called the anterior chamber; and that portion which is situated between the under surface of the iris, called uvea, and the crystalline lens, is called the posterior chamber; see diagram, plate II., fig. 19. These chambers are filled with a peculiar fluid, called the aqueous humour, which is secreted by the vessels of the *corpus ciliare*, in conjunction with the exhaling vessels of the iris. This fluid is of vast importance in assisting the eye to perform its proper functions, and also towards properly refracting the rays of light which pass through it to the lens, and thence to the vitreous humour, to be afterwards reflected upon the retina or expansion of the optic nerve. A superabundant, or an insufficient quantity of this fluid will greatly affect the focus of vision, and thereby assist in producing the diseases called myopia and presbyopia. In many cases of amaurosis, when the ciliary nerves have participated in the affection in common with the retina, I have found the aqueous humour much diminished, and an increase of this fluid has always been attended with the happiest result. This fluid is liable to be affected with various diseases, two of which I will here mention:—the one called *hypopium*, and the other *hypogala*. The first of these words above-mentioned, signifies pus mixed with the aqueous humour; and the second, a milky fluid secreted

by the secretory organs of these parts instead of a perfect transparent fluid.

The eye is supplied with blood by vessels from the internal carotid artery, which pass into the cranium, through the foramen carotideum. When the carotid artery arrives at the anterior clinoid process of the sphenoid bone, it gives off the ophthalmic, see diagram, plate II., fig. 20, and this sends off the centralis retina, the ciliary, the lingualis, muscularis, superior orbital, anterior and posterior oethmoidal, and the angularis. The blood is afterwards returned by veins corresponding to the above arteries, which terminate in the external jugular vein. This vein empties its blood into the subclavian, and the subclavian into the vena cava superior. Besides the optic nerve, the nervi oculorum motorii, the pathetici, and also a branch or two of the trigemini, assist in supplying the eye and appendages with nervous power.

Having noticed the various parts that enter into the formation of the human eye, and having made a few physiological and pathological observations, I must defer any further remarks to a future Lecture, finding, by the hour of the night, that I have already trespassed on your time three quarters of an hour longer than I had intended. In conclusion, allow me to return you my sincere thanks for the universal attention shown me on this, as well as on all former occasions, and to assure you that it will be the proudest hour of my life to see this Society fulfil the objects of its founders, viz. the improvement of medical and surgical knowledge.

